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SCIENCE NEWS LETTER

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THE WEEKLY SUMMARY OF CURRENT SCIENCE • JUNE 19, 1948

New Comet

See Page 389

A SCIENCE SERVICE PUBLICATION

MEDICINE

Plastic Balls for TB

Patients undergo fewer operations and have less deformity when these ping pong balls are placed in their chest. Only a piece of one rib needs removing.

► **LITTLE PING PONG**, or table tennis, balls made of acrylic plastic are helping some tuberculosis patients back to health, Dr. Allan Hurst, medical director of the National Jewish Hospital, Denver, reported at the meeting of the National Tuberculosis Association, in New York.

The patient does not play games with the balls. They are put into his chest, sometimes as many as 100 of them. There they stay, holding his diseased lung collapsed and at the same time preventing a cave-in deformity of the chest.

Up to April 15, 1948, 50 operations using these lucite spheres have been performed at the National Jewish Hospital. In 14 months experience with the operation, no complications have been noticed.

The plastic ball operation is used in some cases instead of the standard procedure of removing the ribs over the diseased part of the lung and letting the

soft rib covering fall in and collapse the lung. With the plastic balls, only a piece of one rib need be removed. The advantages are fewer operations per patient, appreciably less deformity, maintenance of lung function, better collapse where it is desired, less shock, and earlier getting out of bed for the patient.

One possible future disadvantage is that certain vital organs may become eroded because lucite is so rigid. With this possibility in mind, other plastic substances are now being investigated as substitutes.

Enthusiasm for this surgery must be restrained, Dr. Hurst warned, until further knowledge is gained with more experience. Care must be taken in selecting patients for the operation, in order to avoid complications after the operation.

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MEDICINE

Betatron Fights Cancer

High energy x-rays of 20,000,000 volts will be produced by the machine for treatment of patients with deep-seated cancer. Will start some time next year.

► **PATIENTS** with deep-seated cancer of internal organs will be getting treatment with 20 times more powerful X-rays starting some time next year (1949).

The high energy X-rays, 20,000,000 volt instead of 200,000 to 2,000,000 volt, will come from the new betatron to be installed at the University of Illinois College of Medicine in Chicago. It is the world's first installation of a betatron for cancer treatment and research, university officials said.

Advantage of the betatron-produced X-rays for cancer treatment is that they can be concentrated at their maximum intensity on organs deep within the body, such as the stomach and liver. Danger of surface damage, at points where the X-ray beam enters and leaves the body, will be less than with lower energy X-rays. These have their greatest effect

at point of entry into the body which limits their value in treating deep-seated cancers.

The X-rays from the betatron are produced by bombardment of a platinum target with high energy electrons. The high energy electrons themselves have great possibilities for cancer treatment. They offer the possibility of even greater concentration of effect at a point inside the body and of completely using up their energy at that point so none go on to an exit.

The betatron was invented by Prof. Donald W. Kerst of the university's physics department at Urbana-Champaign. He immediately pointed out its cancer-fighting possibilities but research in this direction was delayed during the war.

A push-button controlled instrument

producing a 20-million volt X-rays was developed by University scientists and the Allis-Chalmers manufacturing company of Milwaukee.

One of these will be installed at the college of medicine. Delivery is expected in approximately five months. Dr. Roger A. Harvey, head of the college's department of radiology, will be in charge. Because of tests and developmental work necessary with this entirely new type of cancer weapon, it is unlikely that any patients will be treated until some time in 1949.

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MEDICINE

Plant-Fruit Extract Aids Heart Disease Patients

► A "POWERFUL DRUG" for treating heart disease was announced at the meeting of the Interamerican Cardiological Congress, in Chicago.

"Distinct improvement" in 140 of 250 patients and "moderate improvement" in another 85 patients given daily doses of the drug were reported by Dr. M. R. Kenawy of Cairo, Egypt. Only 25 of the group showed no benefit.

The drug is called khellin. It is extracted from the fruit of a plant growing in the Middle East. The fruit is called Amni visnaga.

Khellin is a powerful dilator of the blood vessels of the heart. Constriction of these blood vessels, with decreased blood supply to the heart muscle, is the trouble in some kinds of heart disease. Khellin's dilating action is very prolonged, lasting for many hours. It is apparently nonpoisonous.

Because of its antispasmodic action, khellin also has been found suitable in treatment of bronchial asthma.

For clearing the swelling, or dropsy, in advanced heart failure, lots of water, some acid and a moderate reduction in salt are needed, Dr. F. R. Schemm of Great Falls, Mont., declared.

This treatment scheme succeeded in four-fifths of 322 instances. But in 160 other instances, the swelling was not cleared when only two of the three measures were used. No two succeeded alone, even when salt was completely removed from the diet, or as much as eight quarts of water was given daily, or when heavy doses of acids were given with one or the other measure. But much less drastic salt restrictions, acid doses and water drinking when used together produced "dramatically" good results.

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AERONAUTICS

Attempt Supersonic Speed

Several planes are under construction to beat the transonic record of the XS-1. They are designed for transonic speeds and to beat the speed of sound.

➤ SEVERAL planes, either completed or under construction, are scheduled to attempt soon to beat the transonic record of the XS-1 which, according to official announcement, travelled faster than the speed of sound in a number of test flights last October at Muroc Field, Calif.

Among these are the XS-2, under construction by Bell Aircraft with the advice of the National Advisory Committee for Aeronautics, in which are being incorporated lessons learned from the XS-1 flights during the past year. There is also the Douglas-Navy Skyrocket, an improved sister ship of the Douglas Skystreak which made the world's official speed record. Also the British have a plane about ready for a final test. Then there is a Russian plane rumored to have already beat the speed of sound.

For security reasons, details of the new XS-2 are not announced. It is to be rocket-powered like the XS-1, but is understood to be less chubby in body

and to have thin swept-back wings rather than the straight thin wings of its predecessor. It is these thin wings, inclined backward like those of a bird in flight, together with a slender body and long, sharply pointed nose, that are included in the Skyrocket to permit it to achieve transonic speeds.

The actual speed of the XS-1 when it travelled faster than sound is not revealed. Sound at sea level travels at about 760 miles an hour. At high altitudes it is less. Seven miles above the earth it is about 660 miles an hour. However, the so-called sonic barrier at any altitude depends upon the speed of sound in that region. The speed of sound depends upon the elastic limits of the air. These vary with temperature changes. In theory at least, a transonic plane could reach a higher actual speed when traveling close to the earth on a hot summer day than it could in the cold upper atmosphere.

This transonic barrier is due to the

formation of pressure waves on the wings of a plane when it approaches the speed of sound. They are the so-called shock waves that grip the plane and tend to hold it back. Their existence is not a theory. They can be actually seen in what are known as schlieren photographs, taken of the air passage over wing models in wind tunnels. These are made by passing parallel rays of light through the tunnel to focus in a camera. The air in the shock waves is denser than elsewhere; consequently the rays passing through are bent, and either a light or a dark place appears on the photograph.

Transonic speeds are important in military activities where great speeds are essential. In civilian flying, however, they are of less interest at the present time principally because present transports are not designed for these excessive speeds, and speeds can be achieved only at a great expenditure for fuel.

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NUCLEAR PHYSICS

Historic Cyclotron Begins Operation at New Site

➤ THE historic atom smasher with which Dr. Ernest O. Lawrence of the University of California first cracked the atom 14 years ago began operation early this month at a new site at the University of California at Los Angeles.

The 37-inch cyclotron which was used in making many important discoveries at Berkeley now makes Los Angeles only the second city on the Pacific Coast to boast an atom smasher.

The 37-inch machine was used in the first successful demonstration of the electro-magnetic separation of the potent uranium 235 from common uranium, an important step in the manufacture of the atom bomb.

Application of electrical frequency modulation control to a cyclotron, a process which doubled the tremendous power of the instrument, was also first adapted to this machine, making it the first synchro-cyclotron in history.

Designed originally to generate energies of 7,000,000 electron volts, the 37-inch cyclotron now accelerates atomic particles to energies of 15,000,000 electron volts.

Intensive research on the nature of the forces which hold matter together—one of the great unsolved problems confronting modern science, the production of radioactive isotopes for medical research and for experiments in nuclear



ROCKET-POWERED XS-1—In a number of test flights, this plane flew faster than the speed of sound, according to information just revealed. Several planes are scheduled to attempt to beat this record.

chemistry are projects planned for this cyclotron.

After a gigantic moving job during which the 80-ton machine was transferred to Los Angeles from the Berkeley campus, the cyclotron was completely overhauled and refurbished under the direction of two well-known young nuclear physicists who cut their scientific

GENERAL SCIENCE

Questionnaire Censorship

► THE civilian Research and Development Board and the Departments of the Army and the Navy were accused of attempting "to prevent scientists from finding out just where they stand on security matters."

The charge was made in a report by the Committee on Secrecy and Clearance of the Federation of American Scientists in Washington. Members of the committee are all Cornell University scientists.

They sent a questionnaire to 140 laboratories last fall seeking information on loyalty clearance of scientists. Forty percent of the laboratories, including the atomic bomb laboratory at Los Alamos, N. Mex., answered the questions. But some officers of the Navy and the Army and an official of the Research and Development Board tried to obstruct the investigation, the committee declared in its report published in the *Bulletin of the Atomic Scientists* in Chicago.

A memorandum from F. H. Richardson, deputy executive secretary of the Research and Development Board headed by Dr. Vannevar Bush, to expert consultants of the Board was termed "intolerable" by the Federation committee.

The memorandum reprinted in the report does not mention the committee's questionnaire specifically. It calls attention to questionnaires concerning clearance procedures and requests that they be sent to the Board before they are answered.

A portion of the Board memorandum declares:

"There are in existence today a large number of organizations whose objective is to gather such information and later use it as material for propaganda and 'smear' programs in an attempt to discredit the U. S. form of government."

Commenting on the memorandum, the Federation of American Scientists report contended that "It operates wholly by innuendo, naming no names, citing no questions."

teeth on this instrument and who accompanied it on the long haul from Berkeley. It is housed in a new \$75,000 temporary building constructed especially for this purpose on the Los Angeles campus.

In charge of the work is Dr. J. Reginald Richardson, associate professor of physics at U. C. L. A.

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The Research and Development Board, the committee found, "has apparently at least some policy-making employees more military than the military."

Both Army and Navy officials were reported to have warned laboratories against answering the committee's questionnaire.

An inquiry by the committee to the office of Rear Adm. Thomas B. Inglis, Chief of Naval Intelligence, asked which of the questions on the questionnaire were classified.

"I regret to inform you that I am unable to supply you with the information requested," the report quotes Adm. Inglis as answering.

"We have told the story of the response to our questionnaire as a sign of 'the Prussian disease,'" the committee of scientists concluded.

The report explains that the term "Prussian disease", which has been used by Dr. Albert Einstein, includes "gradual encroachment upon the rights of scientists as citizens, and upon their freedom as scholars, the suppression of criticism, and the establishment of the official one-track mind . . ."

This report was the second made by the Federation's Committee on Secrecy and Clearance, which several weeks ago criticized loyalty clearance procedures. Members of the committee include a leading atomic scientist, Dr. Hans A. Bethe, and a Nobel prize winner, Dr. P. J. W. Debye, chairman of the department of chemistry at Cornell. Dr. S. H. Bauer is chairman of the group which includes Drs. L. M. Brown, G. K. Fraenkel, A. R. Moore, Philip Morrison, R. S. Rochlin and R. R. Wilson.

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Products made with lard, such as potato chips, pastries and crackers, are kept in good condition much longer by use of a new antioxidant; the same preparation also greatly increases the keeping time of lard itself.

ORNITHOLOGY

Gulls Shown as Robbers Of Other Birds' Nests

► GULLS as birds of prey, taking eggs from the nests of other birds and killing their young, as well as field mice, ground squirrels and other small mammals, make an unusual picture of these white-winged water-fowl presented in *The Condor* (May-June) by Dr. Arthur C. Twomey of the Carnegie Museum, Pittsburgh.

Presence of other birds' eggs in the nests of California gulls has puzzled other observers; but Dr. Twomey states that they are stolen and carried off for food. Sometimes the gulls carry them in

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their beaks, but more often they swallow them whole and later regurgitate them. They may let them lie around in the nest for a while, but after their own young are hatched the alien eggs are broken open and eaten.

California gulls range far inland; Dr. Twomey has observed their habits in Idaho, where he saw them attack and kill the young of wild geese, carrying

them off to feed to their own nestlings. Gophers, ground squirrels and other small animals met the same fate.

Dr. Twomey cautions against regarding California gulls as "vermin" and subjecting them to persecution because of these predatory habits. They destroy immense numbers of destructive insects, he points out, and have long been known as voracious devourers of mice.

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NUCLEAR PHYSICS

New Powerful Accelerator

Expected to be largest and most powerful laboratory research tool of its type in the world. Will take two years to complete and cost \$2,000,000.

► THE most powerful electrostatic accelerator known in the world will be constructed beside a cliff on a mesa in New Mexico at the Los Alamos Scientific Laboratory of the University of California, the U. S. Atomic Energy Commission has announced.

This new Van de Graaff-type generator will yield positive ions with energies up to 12,000,000 electron volts. The energy will be far less than the billion-electron-volt level proposed for new cyclotron-type "atom smashers," but the electrostatic generator has many advantages for certain types of atomic research.

Flexible, high precision energy control to one-tenth of one percent will be possible with the new machine. Scientists can change from one type of ion to another with continuously variable energies from 2,000,000 to 12,000,000 electron volts. Neutron beams between 30,000 and 30,000,000 electron volts will also be available.

Using the new accelerator, it will be possible to study the properties of both light and complex nuclei below 20,000,000 electron volts. Precise data are needed in this range which cannot be obtained

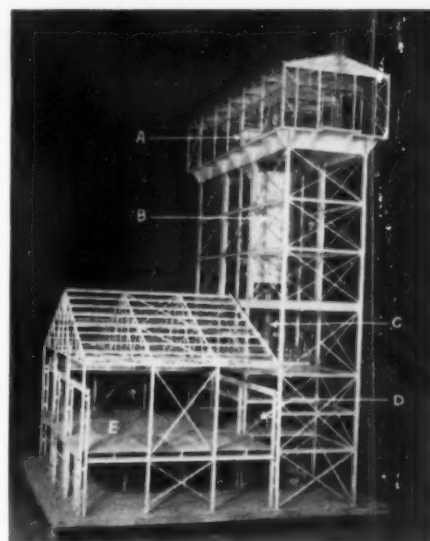
with other atom smashers.

The Van de Graaff generator is named for Dr. R. J. Van de Graaff of the Massachusetts Institute of Technology, the scientist who first used a belt to convey charge to high electrostatic potentials. The new machine planned for Los Alamos will be a pressurized Van de Graaff on which pioneering work was done by Prof. R. G. Herb of the University of Wisconsin.

The cliff-side structure will be 120 feet high with a control room and laboratory space housed on the top of the mesa. The generator will be 13.5 feet in diameter and 39 feet high. Total cost of the new generator and buildings will be \$2,000,000 and two years will be required for completion.

The electric charge is carried from the bottom to the top by a cotton belt 30 inches wide. By spraying the belt with a charge at the base, a great potential difference can be built up between the upper electrode and the ground. This potential difference is used to accelerate charged particles down two evacuated tubes in the column.

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ACCELERATOR MODEL—Important parts of the proposed 12,000,000 electron volt electrostatic accelerator are: (a) heavy crane (b) pressure shell enclosing generator (c) inner insulating column enclosing accelerating tubes (d) 90 degree reflecting magnet and (e) target rooms.

of his discovery being forwarded by Dr. L. Volta, director of the Royal University Observatory, Turin, Italy. Astronomers in this country were notified of the comet's discovery and position by Harvard Observatory, clearing house for such information in the western hemisphere.

Prof. J. J. Nassau, director of the Warner and Swasey Observatory, the Case Institute of Technology, at East Cleveland, took the picture on the cover of this week's SCIENCE NEWS LETTER with the 24-36 inch Schmidt-type telescope-camera at the observatory on June 6 at 4:15 a.m., EDT. Exposure time was four minutes. It shows the comet's tail extending for 2.5 degrees across the heavens. The comet was moving rapidly northwest.

Star-lovers watched the comet as it moved across the heavens, going from the constellation of Perseus into the constellation of Andromeda and on into Perseus again. At first visible just before dawn, as it moved away from the sun the comet could be seen in the early morning hours.

Comet Honda-Bernasconi soon began to fade in brightness, having dropped to fifth magnitude within a week of its discovery.

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ASTRONOMY

Spot Bright New Comet

See Front Cover

► A BRIGHT new comet flashed across the heavens early this month. Of the fourth magnitude when first seen, it was easily picked up with binoculars, and could also be spotted with the naked eye by people far from city lights.

The comet was discovered by watchful

observers both in Japan and Italy. Minoru Honda of Japan's Kurashiki Observatory spotted it on June 2. This is the second comet Mr. Honda has discovered within one year, as he spotted a ninth magnitude one last November.

The comet was independently found on June 4 by Giovanni Bernasconi, word

ASTRONOMY

Planetarium for Home Use

► STARS are now being brought into the classroom and home so that people can more easily learn to identify the constellations and brightest stars. A portable instrument for projecting the heavenly bodies and an inexpensive dome make this practical.

One type of dome can be built for as little as \$25. Designed by astronomers at Pennsylvania State College, it is to be used in connection with the planetarium developed by Dr. Armand N. Spitz, lecturer at Fels Planetarium and educational director of the Franklin Institute, Philadelphia.

The Spitz planetarium produces results strikingly similar to those used in large planetariums. A compact unit only three feet high, it weighs about 25 pounds. A light in the center of a 12-sided plastic box shines through holes punched in the vinylite sides to represent stars. The instrument currently sells for \$720.

The planetarium for home use projects on any surface the images of most of the stars usually seen with the naked eye. Constellations are immediately recognizable and the stars may be reproduced as seen from any location on the earth.

But when the planetarium is used in a room of conventional shape, the heavens as flashed near the corners of the room are distorted. Several inexpensive or quickly-assembled domes have been devised to avoid this difficulty.

FORESTRY

Insect Spreads Elm-Killer

► A small insect of the rather numerous group known as the leaf-hoppers has been convicted of carrying the virus of a disease that kills many elms in Midwestern and Southern states, by research workers of the U. S. Department of Agriculture.

The western elm-killing disease, called phloem necrosis, is quite different from the better-publicized tree malady commonly but incorrectly called the Dutch elm disease, which is known at present only east of Ohio. Phloem necrosis has been found from Ohio and parts of West Virginia west to Nebraska and Oklahoma, and south to Mississippi. The causal organism of the Dutch elm

In one model, plywood ribs are covered with a parachute. This cloth makes an ideal surface for projecting the stars. Another uses molded plywood that, unassembled, can be carried on top of a station wagon. It may be set up in a few minutes.

The \$25 dome built at Penn State has a framework of plywood. The paper surface upon which the stars are projected is cemented or fastened to the ribs with tacks.

In addition to short bolts and rubber cement or thumb tacks the following are needed:

Three pieces of quarter-inch plywood, 8 by 12 feet.

110 sheets of 24 by 38 inch blotting paper.

Strips of plywood about two inches wide, cut from the large pieces, are arched to the center, forming the ribs for the dome. They are bolted to a circular disk of plywood that forms the dome's top. Other strips of plywood, placed on the framework several feet from the floor form the bottom of the planetarium dome. Blotting paper, cemented to the plywood ribs, forms the surface on which the stars are projected. The portable planetarium is installed on a low table within the dome.

"A ten-foot dome of this construction can be knocked down in about an hour, reassembled in less than three hours," says Dr. Henry L. Yeagley, associate professor of physics at Penn State.

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DOME FOR SKY STUDY—Plywood ribs for the Penn State Dome are bolted to a circular piece of plywood as spokes are bolted to the hub of a wheel.

developed the disease and died.

Now a search is on to find the right insecticide and spraying methods to protect street, lawn and park elms against this new-found enemy.

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GENERAL SCIENCE

UNESCO Plans Program For Occupied Germany

► A FOUR-POINT program to extend the work of the United Nations Educational, Scientific and Cultural Organization to occupied Germany has been announced by UNESCO headquarters in Paris.

The program adopted by a subcommittee includes:

1. Distribution of UNESCO publications, documents and other materials in Germany.
2. Facilitating the exchange of publications between Germany and other countries.
3. Studying the question of textbooks for Germany.
4. Surveying the opportunities and problems of exchanges of persons between Germany and other countries.

UNESCO's program in Germany will be carried on in cooperation with Allied occupation authorities. A similar program is being planned for Japan.

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ENGINEERING

Prevent Pipe-Corrosion

Connecting zinc cylinders to steel underground gives corrosion protection. This method is especially effective for remote areas too far away from electrical power.

► THE corrosion of steel underground, such as in pipes was adequately prevented over test periods ranging from three to six years by connecting zinc cylinders to the steel, the National Bureau of Standards has found in tests conducted by I. A. Denison and Melvin Romanoff of its staff.

Underground pipe lines have been widely and effectively protected from the corrosive action of the soil by the use of electricity for some time. If an electrical supply is handy, protection can be easily applied. But pipelines transmitting oil, gasoline and natural gas over vast distances are often too far away from electrical power to permit its economical use. It is for protection in these remote areas that the Bureau has sought improved methods.

Corrosion of steel in the soil is caused largely by electric currents set up by chemical action. Technically, it is often caused by differences in electrical potential of local areas on the corroding surface. Those areas whose potentials with respect to conventional reference electrodes are relatively high are designated as anodes, while areas of lower potential are known as cathodes. The electric current associated with corrosion flows toward, rather than from, the cathode areas. The cathode areas are not, therefore, subject to corrosion, but the anode areas are.

However, if sufficient current from an external source is caused to flow toward the corroding surface, the potential difference between the local anodic and cathodic areas is eliminated, and consequently the cause of corrosion.

A source of electrical energy for corrosion protection, in areas where underground pipe is removed from other electric power, can be provided by the galvanic corrosion of bars of the electronegative metals, zinc, magnesium or aluminum, buried at suitable intervals along the right of way and connected to the pipe line.

The Bureau's recent investigations were relative to the behavior of zinc anodes for cathodic protection in various types of soil. Experimental zinc-steel couples were installed at eight sites. The cathode

of the couple was a small steel ring, to which was connected either one, two or three zinc anodes. Unconnected steel rings and zinc cylinders were also buried at each test site. Data obtained, among other information, indicate the proper amount of current to give just the protection necessary.

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PHYSICS

Thundercloud Registers Highest Electrical Charge

► IN planes that were three times hit by lightning during the course of their researches, scientists of a joint Army-Navy team gathered data during the war on the electrical charges in various types of clouds.

These modern Ben Franklins carried their instruments into the clouds to measure the electrical charges which Franklin is credited with first discovering in his famous kite experiment. A summary of the latest results is reported by Dr. Ross Gunn, now of the U. S. Weather Bureau, in the *Journal of Applied Physics* (May).

Most significant data were obtained by mounting one measuring instrument on the belly of a plane and one on its back, and expressing the differences in electrical potential between them in terms of volts per centimeter of distance.

Highest reading obtained was 3,400 volts per centimeter, registered while the plane was flying through an August thunderstorm. An instant later, a lightning-bolt hit the right wing-tip and tore out through the plane's nose. There were two other readings made in thunderclouds that were higher than 2,000 volts per centimeter.

By contrast, charges in ordinary, quiet clouds gave readings lower than 40 volts per centimeter when steady rain was falling, and lower than 10 volts per centimeter in clouds yielding no rain.

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TROUBLE ON THE TAKE-OFF—The loon is a capable flier, but it sometimes has flight trouble because of its massive weight and short wings. Once in the air, the bird flies at great speed with rapid wing beats. But its flight may be grounded by bad weather. When this happens, the loon does not crash. Results, however, may be just as disastrous to the bird. If forced down on land, the loon, a web-footed water bird, can only crawl along with the aid of its bill and wings. This makes the grounded loon easy prey of predatory animals.

CHEMISTRY

**Antibiotic Discovered
In Wood of American Tree**

► ROT-PROOF qualities in the heartwood of Western white cedar or arbovitae may possibly be due to an antibiotic, or penicillin-like compound, newly discovered in this American tree species by two Swedish chemists, Drs. Holger Erdtman and Jarl Gripenberg, of the Royal Institute of Technology, Stockholm, and reported in *Nature* (May 8).

From an oil which two American chemists had extracted from this wood the Swedish scientists obtained a crystalline substance which forms ring-shaped molecules of the formula $C_{10}H_{12}O_2$. This seems to possess high germ-stopping powers. There are three varieties of this compound, differing only in the arrangement of the atom-groups within the molecule.

Drs. Erdtman and Gripenberg have named the newly identified substance "thujaplicin", from the botanical designation of the tree, which is *Thuja plicata*. It is a native to the west coast of North America, from Alaska to northern California. The three slightly different varieties of the compound they have named alpha, beta and gamma thujaplicin.

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VETERINARY MEDICINE

**DDT May Be Effective
Against Mange on Dogs**

► DOGS afflicted with a particularly bad kind of mange may be cured by DDT, if results in early trials are confirmed.

The idea for using this anti-insect chemical for mange comes from Dr. Emilio Estrada, veterinarian of Guatemala City, C. A. He reports his experiences with DDT for mange in the *Journal of the American Veterinary Medical Association* (June).

The first case was in a two-year-old dachshund. That was three years ago and Dr. Estrada could not get rotenone to treat the condition. So he made up a 2.5% ointment with powdered DDT in vaseline and tried that daily for 10 days. By that time the hair was beginning to grow on the spot where it had fallen out and scrapings of the spot did not show any of the *Demodex* mites that were causing the condition.

Good results were also obtained in two other dogs after daily treatment for 15 days or every other day treatment for

20 days. A commercial rotenone preparation, when again available, was tried in several cases but in some had to be used for more than six months. In many of these cases the owners became dissatisfied and stopped the treatment or had the dog sacrificed.

While Dr. Estrada does not draw any conclusions from three cases, he thinks the DDT formula has merit. The one he now uses contains oil of thuja and zinc oxide as well as DDT. He thinks these help relieve the irritation and promote healing of raw surfaces, but he urges caution in treating large areas. No symptoms of poisoning were seen. He considers this especially noteworthy in the second case, since this dog licked much of the ointment off his lips.

The mange for which the DDT treatment was tried is called follicular mange. It is an intractable form due to the presence of mites in the hair roots.

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INVENTION

**Batting Practice Machine
Trains for Safe Hits**

► YOUNGSTERS aspiring to be the Ted Williamses and Joe DiMaggios of tomorrow might do well to take some swings at an invention on which Robert V. Fessler of Indianapolis has received U. S. patent 2,443,131. It is a practice machine intended to train you into having your bat moving in that safe-hitting horizontal direction during the critical moment when it connects with the ball. Fellows who persist in a down-and-up-again swing are very likely either to top the ball for an easy grounder or to clip it underneath for an easy pop fly.

Mr. Fessler's invention provides a series of white-painted spots the size of a standard baseball, backed by rubber cushions, all mounted on a solidly planted and braced hardwood post. Rods from behind these targets ring a bell if you hit squarely. There is a whole vertical series of targets, representing all possible heights of fair pitches.

Just to make sure you don't get off any of that down-and-up-again stuff, the machine has a series of long rubber rods, reinforced with coil springs inside, sticking out between the targets. There is just enough space between any two of them for a bat to get in, if your swing is strictly on the level. If it isn't, these stiff rubber fingers give your bat the brush-off—and you don't ring the bell.

Science News Letter, June 19, 1948

IN SCIENCE

ENGINEERING

**Diesel Locomotives May
Haul Most Trains Soon**

► DIESEL locomotives within a decade or less will haul most of the American railroad trains, the Society of Automotive Engineers, meeting in French Lick, Ind., was told by President J. W. Barriger, of the Chicago, Indianapolis and Louisville Railway Company.

Diesels already surpass steam locomotives in virtually all respects, he said, and rapid future progress in design and development will establish the diesel as definitely superior. While the diesel locomotive is the most expensive motive power unit, it can make even transcontinental runs with ease and dependability, and be ready for the return trip with only routine servicing.

Every four years, he stated, the railroads spend the equivalent of their original investment in steam locomotives in repairs to them. The gross annual expenses of owning and operating steam locomotives represent about 75% of the original cost of these machines. The low cost of diesel maintenance is greatly in their favor, he indicated.

Science News Letter, June 19, 1948

ENGINEERING

**Auto Brake Adapted from
Hydraulic Airplane Brake**

► HYDRAULIC BRAKE for the automobile, a radically new type adapted from a wartime airplane brake, is claimed to have greater braking surface and more positive action than previous car hydraulic brakes.

The new automobile brake was developed by the Glenn L. Martin Company, of Baltimore, aircraft manufacturers, from its improved airplane brake. It has already proved satisfactory under actual road conditions but is not yet ready for marketing.

This Martin brake, which has no wheel cylinders, pistons and linkages, involves use of a continuous ring seal that fits in a groove in the shoe brake support. Hydraulic fluid, actuated by the brake pedal, enters this groove under the seal, forcing it outward and causing the brake shoe to make a continuous contact with the drum.

Science News Letter, June 19, 1948

THE FIELDS

ORNITHOLOGY

Investigate Family Life Of Elusive Curlew

► THE only bird in North America whose nest and young have never been seen will have its family life intensively investigated this summer by an expedition that recently left for Alaska, under the leadership of Prof. A. A. Allen of Cornell University.

The bird is the bristle-thighed curlew, one of the numerous family of rather small shore birds with long, curved beaks. This particular species was first discovered in 1785 on Tahiti, and long was considered strictly a South Pacific bird. Then it was seen in 1869 in Alaska, and it is now considered certain that its breeding ground is in that territory.

Prof. Allen and his colleagues will use planes in seeking the nests of the elusive curlew. First establishing a base at one of Alaska's regular air fields, they will fly to the shores of upland lakes, then do their searching on foot. The first man to find a pair of the birds will pass the word to his scattered companions, and all will converge on that one area for more intensive hunting for the hidden nest.

The expedition is sponsored jointly by Cornell University and the National Geographic Society.

Science News Letter, June 19, 1948

ASTRONOMY

Five-State Search on for Persons Who Saw Fire-Ball

► A great fire-ball flashed in the early evening dusk of Monday, June 7, at 8:05 p.m. CST.

Spotted by an 18-year-old state Science Talent Search scholarship winner, Thomas Scott, who reported his observation to the American Meteor Society, the meteorite left a smoky train lasting four minutes as seen from Nauvoo, Ala.

Dr. Charles P. Olivier, director of the University of Pennsylvania's Flower Observatory at Upper Darby, Pa., believes that thousands of people must have seen the brilliant sight in the skies of western Tennessee, western Kentucky, southeastern Missouri, northeast Ark-

ansas and southern Illinois. Reports from all who saw it are requested by Dr. Olivier.

The piece of rock from outer space must have entered the earth's atmosphere about where Missouri, Kentucky and Illinois come together. People closer to it than the young observer, saw it more brilliantly and with a train lasting longer.

Scott, who is described by Dr. Olivier as the "best amateur meteor observer" in the society, will use his scholarship money, won in the Alabama State Science Talent Search, conducted by the Alabama Academy of Sciences with the cooperation of Science Service, to study with Dr. Olivier beginning next fall.

Scott is the son of a retired telegraph operator who now runs a truck farm. He lives in a small town of about 500 population and his favorite scientific hobby is watching and recording meteors from a hill near the town.

Science News Letter, June 19, 1948

ORNITHOLOGY

Birds Found to Use Tools In Search for Their Food

► SOME birds find that tools help them secure a juicy meal.

An outstanding example of a tool-using bird is the woodpecker-finch of the Galapagos Islands. In searching crevices for insects, the bird is handicapped by its rather short, thick bill. To offset this the woodpecker-finch picks up a slender, short length of stick or the spine of a prickly pear and with it pokes into cranberries, states Dr. Austin L. Rand, curator of birds of the Chicago Natural History Museum. When the insects thus disturbed run out, the stick is dropped and the food seized.

The European song thrush feeds in part on snails and winkles. To get the soft edible animal out of its shell, it carries or drags the snail to a favorite rock and hits it against the rock until the shell is broken and its contents exposed.

A few other species bring shellfish to special places. "Herring gulls on our northeastern coast pick up mussels and clams and, flying over a rock or some other hard surface, drop the shellfish and follow it down," Dr. Rand states. "If the shell is broken, the dish is ready for the gull; if the shell is not broken the gull takes the shellfish up to a higher altitude and tries again."

Science News Letter, June 19, 1948

PUBLIC HEALTH

Blockade Is Deadliest Weapon in Anti-Rat War

► RAT-KILLING drives are all to the good, but for permanent results in the war on rats the blockade is the deadliest weapon, declared Albert M. Day, director of the U. S. Fish and Wildlife Service. Mr. Day spoke as guest of Watson Davis, director of Science Service, on Adventures in Science, heard over the Columbia network.

Depriving rats of free lodgings at man's expense is the first objective in the fight, the speaker pointed out, quoting the three-pointed slogan: "Build 'em out, starve 'em out, and finally kill 'em off." To deny rats living space, he continued, all buildings should be either on rat-tight concrete or masonry foundations or on two-foot concrete piers, higher than a rat can jump. All openings big enough to admit a rat should be securely closed. Backyard accumulations of rubbish should be cleared up.

Rat-proofing was learned the hard way in San Francisco, when rat-borne bubonic plague hit that city at the beginning of the century. All sorts of half-way measures were tried, but the plague kept on claiming victims. Finally an object lesson carried conviction: in rat-proofed Chinatown the plague stopped; in the nearby Italian settlement, which had not been rat-proofed, it persisted.

The "starve 'em out" objective can be realized partly through "build 'em out" measures, as these are applied to places where food is stored and handled. Requirement that all grain bins be metal-lined is being written into many municipal codes nowadays. Finally, every householder must do his share by putting all garbage in solid containers with tight metal lids which are carefully kept closed.

For the "kill 'em off" part of the campaign, safest effective rat poison is still red squill, since this is deadly to rats but not human beings and pet animals. ANTU may be used, though if a quantity is taken by accident it may make you sick. The most toxic of the newer rat poisons, 1080, is available only for specially trained professionals.

But however the rats are killed, emphasis returns to the "build 'em out" part of the campaign. For other rats will only move in after the original rat population has been exterminated if the premises are left in condition to invite such invasion.

Science News Letter, June 19, 1948

CHEMISTRY

Laws of Matter Up-to-Date

Compiled by HELEN M. DAVIS, Editor of CHEMISTRY
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1. A single ATOM is the tiniest particle of any chemical element that can exist by itself and retain the qualities that mark it as that element.

2. All material things in the universe known to our senses are composed of one or more CHEMICAL ELEMENTS.

3. Substances composed of more than one element are known as COMPOUNDS. Atoms of elements are held together in compounds by electrical forces in the outer parts of their structure.

4. The smallest theoretical unit of a compound, usually composed of two or more atoms, is known as a MOLECULE.

5. The smallest actual units of crystalline compounds found by use of microscopes and the electron microscope seem to be structures built up of the different atoms alternating in three-dimensional patterns to form the CRYSTAL LATTICE.

6. There were believed to be 92 CHEMICAL ELEMENTS, from hydrogen (${}^1\text{H}$) the lightest to uranium (${}^{92}\text{U}$) the heaviest, before the developments which led to utilization of atomic energy.

7. Two new elements, NEPTUNIUM (${}^{93}\text{Np}$) and PLUTONIUM (${}^{94}\text{Pu}$) were formed by neutron bombardment of Uranium 238.

8. Two additional new elements, AMERICIUM (${}^{95}\text{Am}$) and CURIUM (${}^{96}\text{Cm}$) have since been made by similar methods. More elements will follow.

9. When elements are represented, as above, by their chemical SYMBOLS, the subscript number is the atomic number. This is different for each element. The superscript number represents the atomic weight.

10. One of the qualities characteristic of matter is weight or mass. ATOMIC WEIGHT is expressed on a relative scale, as compared with the weight of hydrogen which is taken as one.

11. For convenience, the weights have been adjusted to make the atomic weight of the most abundant kind of oxygen 16.00. This shift makes most of the atomic weights nearly whole numbers, but changes that of HYDROGEN to 1.008. Physicists believe this fraction has significance for calculating the energy of nuclear reactions.

12. ATOMIC NUMBER is the measure of the electric charge on the nucleus of the atom. Atomic weight is the measure of the atom's mass.

13. Different samples of the same element, when tested by chemists, are sometimes found to have DIFFERENT ATOMIC WEIGHTS. Lead which occurs with radium, for example, has a different atomic weight from ordinary lead.

14. In all other ways the two kinds of lead are chemical twins, exactly alike except for weight. Elements which differ in weight only are called ISOTOPES.

15. Almost every element has been found to have a number of isotopes, some STABLE, some RADIOACTIVE. The atomic weight of the most stable isotope is generally used in listing the element.

16. Uranium has several isotopes. The

usual kind, whose atomic weight is 238, was used to produce the new elements. U-235 was used to make the ATOMIC BOMB.

17. The isotope U-235 and the element plutonium can be used for bombs because they are capable of FISSION.

18. When fission occurs the nucleus of the atom SPLITS into two (occasionally more) lighter elements, with release of nuclear energy.

19. In some recent experiments with a high-powered cyclotron, even more thorough fragmentation of atomic nuclei resulted. This process, resulting in many light elements, was named SPALLATION.

20. Different elements, quite distinct in chemical behavior, may have isotopes of the same atomic weight. We have ${}^{238}\text{U}$, ${}^{238}\text{Np}$, ${}^{238}\text{Pu}$, all with different properties. Such elements are called ISOBARS.

21. All atoms are believed to be composed of standard interchangeable parts. These are PROTONS, NEUTRONS and ELECTRONS.

22. Protons and neutrons make up the NUCLEUS of the atom. The structure of the atom is much like that of the solar system. The nucleus corresponds to the sun at the center. The planets are electrons.

23. The proton and the neutron each have a mass about equal to that of a hydrogen atom, which is 1 on the chemist's scale. Each is about 1800 times heavier than the electron. Particles called MESOTRONS or MESONS, intermediate in weight, are known, but their relationship to other atomic particles is as yet obscure.

24. The ELECTRONS, light in weight and some distance away from the heart or nucleus of the atom, revolve around the nucleus much as planets revolve around the sun. They are held in their courses by electric attraction.

25. The proton has a POSITIVE charge of electricity, the electron has a NEGATIVE charge equal and opposite to the positive charge of the proton. The neutron has no charge at all.

26. The difference in chemical properties of the elements is caused by difference in the number of protons in the nucleus. This is the ATOMIC NUMBER.

27. Chemical VALENCE, or combining power, is governed by the electrons in the outermost orbits of each atom.

28. Atomic weight is the SUM of the weights of the protons and neutrons in the nucleus.

29. It is the NEUTRON which figures in the transmutations which give atomic power. Neutrons can PENETRATE to the nucleus of heavy atoms when charged particles would be repelled by charges in the atom. The neutron is absorbed by the nucleus to form a heavier, unstable isotope of the element. This unstable isotope then decomposes radioactively, emitting an electron and changing to a new element one atomic number greater.

30. The HYDROGEN atom is believed to have just one proton as its nucleus, with one electron circling around it. Hydrogen's

atomic weight and atomic number are each one.

31. Hydrogen has an isotope which is just like ordinary hydrogen except that it is twice as heavy. It is known as "heavy hydrogen" and sometimes as DEUTERIUM (Symbol: D). Its compound with oxygen is called "heavy water."

32. The nucleus of HEAVY HYDROGEN contains one proton and one neutron. The atomic number of heavy hydrogen is one, corresponding to one proton. The atomic weight is two, corresponding to the two heavy particles, proton and neutron.

33. HELIUM has two protons and two neutrons in its nucleus. The two protons correspond to helium's atomic number two. The combined weights of protons and neutrons in the nucleus give helium its atomic weight 4. Two electrons, held in their orbits by the two protons, revolve around the nucleus.

34. The VOLUME of an atom is determined by the orbits of its outermost revolving electrons. Only a small fraction of the size of an atom is actually occupied by the protons, neutrons and electrons, just as the space occupied by the sun, the earth and other planets is only a small part of our solar system.

35. In spite of all the unoccupied SPACE, an atom is quite IMPENETRABLE to other atoms and to larger bodies. The electrons revolve millions of times a second, and keep everything out of the space within quite as effectively as though they were everywhere at once.

36. The only things that can get inside an atom are smaller things, FRAGMENTS of other atoms, protons, neutrons or electrons. They must be shot with just the right speed. These fragments of atoms are observed as radiations given off by radio-active elements.

37. RADIATION is wave motion, known to us as the electro-magnetic waves used for radio transmission, heat, light, X-rays and cosmic rays. Large numbers of extremely tiny particles in motion together act like waves.

38. Three types of rays are given off by radio-active substances. ALPHA particles are high-speed nuclei of helium atoms. BETA particles are high-speed electrons. GAMMA rays are electro-magnetic radiations similar to X-rays and light.

39. Of these, only the gamma rays are properly called radiations, and even these act very much like particles because of their short wave-length. Such a "particle" or quantum of gamma radiation is called a PHOTON.

40. Because their radiation is emitted as photons, the SPECTRA of elements are seen as bands of colored light, not as a continuous series of wave-lengths. Such bands are found also beyond the limits of visible light, but can be detected by photography.

41. Electrons in beta rays may be bent out of their straight-line paths by the influence of a magnet. This principle is used in the construction of the CYCLOTRON.

42. POSITRONS are like electrons, but are bent toward the opposite pole of the magnet because their charges are + instead of -.

43. The kind of rays emitted and the HALF LIFE (the time in which half the radioactivity decays) is a constant characteristic of each radioactive isotope of every element, and is used to identify that isotope.

44. In general, the gamma rays are very penetrating, the alpha and beta rays less so. Even though the alpha and beta rays are not very penetrating, they have enormous SPEED.

45. The speed with which atom particles travel is the source of atomic energy. ENERGY is capacity to do work. It is work stored up for future use.

46. If you raise a weight to a height above the ground and suspend it there by some device, the WORK you put into raising it can be stored there indefinitely as POTENTIAL ENERGY. It will be there, ready, whenever you decide to release it.

47. The energy which a moving body has because it is in motion is called KINETIC ENERGY. The kinetic energy of any particle depends upon its mass and the square of its velocity. Energy is conserved by the moving particle until it strikes an object, then work is done.

48. All ENERGY is either potential or kinetic. Either one can be converted into the other. These two conversions are continually occurring.

49. Particles of atomic size have kinetic energy arising from several different kinds of MOTION. All atoms are constantly in motion.

50. If the atoms are so dispersed that the material constituting them is a GAS, that gas will exert pressure on all sides of the container that holds it, on account of the motion of the gas molecules.

51. Atoms which compose an element that will combine readily with another element, as hydrogen or carbon will combine with oxygen, have unsymmetrical arrangements of the outer electrons in their systems. These unsymmetrical arrangements tend to set up a sort of strain, which causes CHEMICAL COMBINATION to take place when elements with suitable combining powers are brought together.

52. These unsymmetrical arrangements give rise to FORCES which result in kinetic energy. This energy appears, for example, when carbon and oxygen burn to carbon dioxide, giving off heat, or hydrogen and oxygen explode to form water, again giving off heat.

53. Chemicals combining to form stable compounds give off energy in the process. These are known as EXOTHERMIC REACTIONS. Combinations which absorb energy, forming unstable compounds, are known as ENDOTHERMIC REACTIONS. Explosives, for example, which are highly unstable, are formed by endothermic reactions.

54. Chemical forces, electricity and heat are all forms of energy. Potential and kinetic energy may be distinguished in each case.

55. These energies all arise from motion of the atom as a whole, or motion resulting from attractions and repulsions between the outer PLANETARY ELECTRONS of the atom's structure.

56. Energy resulting from motion of particles deep within the structure of the atom was unknown until the discovery of RADIOACTIVITY.

57. Radioactive elements undergo SPONTANEOUS breaking up of their atoms, giving off alpha and beta particles and gamma rays. Loss of these particles causes the radio-active elements to change into other elements.

58. The energies shown in these TRANS-MUTATIONS are thousands of times greater than the kinetic energies which the molecules of a gas have by reason of their motion when heated. They are thousands of times greater than the energy changes per atom in chemical reactions.

59. The property of matter that connects it with motion is INERTIA. Inertia is opposition to change of motion.

60. One conclusion that appeared early in the development of the theory of RELATIVITY is that the mass due to inertia of a moving body increases as its speed is increased.

61. This increase implies an equivalence between an increase in energy of motion of a body (kinetic energy) and an increase in its MASS.

62. It is for this reason that Einstein suggested that studies of radioactivity might show the EQUIVALENCE of mass and energy.

63. Einstein's statement is that the amount of energy, E , equivalent to a mass, m , is given by the equation $E=mc^2$ where c is the VELOCITY OF LIGHT.

64. From this equation, one kilogram (2.2 pounds) of matter, if converted ENTIRELY into energy, would give 25 billion kilowatt hours of energy. This is equal to the energy that would be generated by the total electric power industry in the United States running for approximately two months.

65. Compare this fantastic figure with the 8.5 kilowatt hours of heat energy which may be produced by BURNING an equal amount of coal.

66. Until the atomic power research program, no instance was known of matter being converted into energy without more energy being used to produce the transformation than was released by it.

67. Two axioms of physics state: (1) MATTER can be neither created nor destroyed; (2) ENERGY can be neither created nor destroyed. For all practical purposes they were true and separate principles until about 1940.

68. It is now known that they are, in fact, two phases of a single principle, for we have discovered that energy may sometimes be CONVERTED into matter and matter into energy.

69. Such conversion is observed in the phenomenon of nuclear FISSION, a process in which atomic nuclei split into fragments with the release of an enormous amount of energy.

70. The extreme size of the CONVERSION FACTOR explains why the equivalence of mass and energy is never observed in ordinary chemical combustion.

71. We now believe that the heat given off in such COMBUSTION has mass associated with it, but this mass is so small that it cannot be detected by the most sensitive balances available.

72. Transformation of matter into energy is an entirely different sort of phenomenon than the usual chemical transformations, where the matter is changed into a different form but its MASS persists.

73. From the standpoint of the Laws of the Conservation of Matter and of Energy alone, transformation of matter into energy results in the DESTRUCTION of matter and CREATION of energy.

74. The OPPOSITE transformation, which astronomers believe may be going on in some of the stars, amounts to the destruction of ENERGY and the creation of MATTER.



HIGH-VOLTAGE GAS TESTER—
Breakdown limits of new types of gases for possible use in transformers, replacing oil, are determined in this "howitzer" at Westinghouse Research Laboratories. Up to 600,000 volts may be used; when the electrical surge becomes too powerful for the gas, it leaps from one electrode to another. Gas-filled transformers could be lighter and smaller than present types.

ENTOMOLOGY

Plant Growth Compounds Aid Mosquito Egg-Hatching

➤ MOSQUITO eggs are helped to hatch by some of the same chemicals that stimulate growth in plants. This renders all the more probable the suspicion held by many entomologists, that their eggs are similarly helped in nature by plant substances dissolved in the water on which they are laid.

Influence of synthetic plant growth-

★ ★ ★ ★ ★ ★ ★ ★ ★ ★

WYOMING

Ride, fish, geologize or just relax. How?

Paton Ranch will give you trout fishing in a mountain stream as it flows out of a canyon in the Big Horn Mountains, daily horseback rides along the picturesque trails and excellent food—most of which is grown on the ranch.

The region abounds in geological and historical interest—dinosaur bones, marine fossils and Indian implements are found nearby.

Write for folder—Paton Ranch, Shell, Wyoming

Do You Know?

Of the 96 chemical elements known to man, some 35 to 44 are used in most of today's automobiles.

Sodium phytate, a corn chemical, promises to be useful as a water softener, and in rustproofing and textile conditioning.

Infra-red light is used successfully to heat and dry pine tree cones to obtain the seed; it accomplishes in four hours what formerly required two days.

Ramie is a crop with a promising future in America; when its gum is removed, its fiber makes durable fabrics, and its dehydrated leaves make an excellent cattle feed.

ASTRONOMY

Two Faint Stars Found To Increase in Brightness

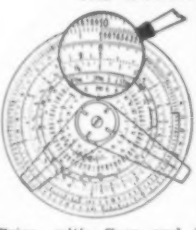
► TWO faint stars recently have been found to suddenly increase in brightness, according to reports received at Harvard College Observatory.

Dr. B. S. Whitney of the University of Oklahoma reported that photographic plates he made June 2 and 3 show a tenth magnitude star not visible several years ago. Its right ascension is 19 hours, 47.3 minutes; its declination is plus 36 degrees, 11 minutes. This discovery was confirmed by observations at Harvard's Oak Ridge Station.

The International Astronomical Union reports information from Moscow of the discovery of a ninth magnitude nova one degree south of Beta Serpentis. Thus "new star," far too faint to be seen without a telescope, is in the constellation of the serpent, now high in the southeast.

Science News Letter, June 19, 1948

THE BINARY SLIDE RULE



equals a 20 Inch Straight Slide Rule in precision. Has C, CI, A, K, Log, LL1, LL2, LL3, LL4, Binary, Add and Subtract Scales. Gives Trig. Functions from 0 to 90 degrees 1 Minute. The Engine-divided Scales are on white coated aluminum. Permanently accurate. Dia. 8 1/4". Large figures and graduations eliminate eyestrain. Approved at leading Universities.

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promoters on mosquito eggs was investigated by Albert Abel-Malek, in the laboratories of the Ohio State University. He used very dilute solutions of three of them: indole acetic, naphthalene acetic and indole butyric acids, as well as an infusion of bluegrass stems in water, and finally pure distilled water containing nothing else whatever.

The mosquito eggs hatched well on the three chemical solutions and the grass infusion, but the control eggs on absolutely pure water failed to turn out a single wiggler.

Mr. Abel-Malek presents a detailed report of his experiments in the *Annals of the Entomological Society of America* (March).

Science News Letter, June 19, 1948

PSYCHIATRY

Our Mental "Aching Back"

Author draws on his war experiences for suggestions, which he believes, will help us meet our aching back problems in civilian life.

► "OH, my aching back," GI Joe's favorite and most symbolic slang phrase during the war, applies to the whole world now and will for some time to come.

So declares Dr. William C. Menninger, general secretary of the Menninger Foundation and chief consultant in neuropsychiatry to the Surgeon General of the Army, 1943-1946.

A kind of prescription for warding off "the aching back" in these days of heavy world and personal burdens and stresses is to be found in Dr. Menninger's new book *Psychiatry in a Troubled World* (Macmillan). Dr. Menninger refers to the mental and emotional troubles, rather than a physical backache.

Drawing on his war experiences with the millions of "Joe's and Mary's from Brooklyn and Kokomo" who made up our huge war machine, he gives nine factors which helped the Joe's and Mary's stay normal in spite of war's stress and strain. These same nine, he believes, will help each of us meet our aching back problems in civilian life. They are:

1. Recognition of the existence of a struggle between the personality and the environment.

2. A job with a purpose.

3. Teamwork. Working with a group helps the worker as well as the group, is good for mental health.

4. Leadership. This works both ways, too. Most of us have to work under someone, but most of us also are leaders at times, either as parents, teachers, foremen or presidents of clubs.

5. Intellectual growth, getting new ideas, learning new things.

6. Promotion, for the individual and

for the family, the neighborhood, the city, the state and the nation.

7. Recreation.

8. Religion. Like most psychiatrists Dr. Menninger believes there is no antagonism between religion and psychiatry.

9. New awareness of emotional conflicts, of the occurrence of "operational fatigue" in civilian as well as military life.

Science News Letter, June 19, 1948

PHOTOGRAPHY

Gage Radioactive Elements In Rocks with Photography

► ESTIMATION of the amount of atomic energy elements, uranium and thorium, in rocks may be done in the future by photography.

Dr. J. H. J. Poole, and J. W. Bremner of Trinity College, Dublin, have placed special nuclear research photographic plates in contact with flat surfaces of rocks cut with a diamond saw and left them there for one to three weeks. Stars with two to five rays appear in the photographs caused by the alpha particles or the hearts of helium atoms that are given off from the radioactive elements.

Distribution of radioactive elements in rocks is shown to be very sporadic, especially in coarse grained rocks like granites, they declared in a report to *Nature* (June 5).

The photographic method was originally suggested two years ago by Mme. Irene Curie-Joliot, Nobelists herself and daughter of the Curies who discovered radium.

Science News Letter, June 19, 1948

PSYCHOLOGY

Musical Taste Tested

► THE old adage "No accounting for tastes" failed to receive scientific support from a survey of musical tastes of more than a thousand residents of Evansville, Ind.

Whether you would rather hear the Boston "Pops" Orchestra playing "Drink To Me Only With Thine Eyes" or Ted Daffan's Texans sounding off with "Beyond the Shadow of a Doubt" depends on your sex, your age, how much you have heard of either kind of music before and also upon your social class.

This was discovered in a survey conducted by Dr. Karl F. Schuessler, a sociologist now at Indiana University. He reports his findings in the *American Sociological Review* (June).

If you want to see how your own musical taste measures up, listen to the following records in addition to the two mentioned above: Bach, "Tocatta, Adagio and Fugue in C Major," by the Minneapolis Symphony Orchestra; "Sugar", a jazz piece played by the Capitol Jazzmen; Piston, "The Incredible Flutist", by the Boston "Pops"; Strauss, "Vienna Life," by the Andre Kostelanetz Orchestra; Tchaikowsky, "Andante Cantabile," by the Minneapolis Symphony; and "Time and Time Again," by the Wayne King Orchestra.

If you are a man, don't be too surprised if you don't care much for any of these pieces.

"The enjoyment of classical music in American culture is primarily a feminine reaction," Dr. Schuessler concludes as one result of the survey. More women than men like all types of music, he found.

Hill-billy music is the only kind preferred by more men than women.

Old people like old songs, the survey revealed. Persons 50 years or more old like "Drink To Me Only With Thine Eyes" and "Andante Cantabile."

As you might expect, musical training helps to account for your musical taste. Training makes people dislike jazz and hill-billy music. It does not, however, affect your liking for popular selections like the Wayne King record. Both untrained and trained ears delight in the Strauss waltz.

Your social and economic background affects your taste, too. Wealthy people enjoy classical music, while poor people like jazz and hill-billy, it was indicated.

Comparison between a group of 58 Negro girls and 78 white girls from about the same economic position showed that it is not the Negro that prefers jazz. The differences disclosed mainly that the Negro girls are less forced into a mold by definite standards of taste in their group. White girls have stronger opinions and are more enthusiastic about the waltz, jazz and popular music.

That religious training also influences your musical taste was revealed by the fact that some church workers refused to take part in the test. They informed the investigator that "only religious music is suitable for the edification of man."

Dr. Schuessler is now planning new studies which may help explain musical tastes within certain types of music. He also hopes to investigate the importance of your personality in your taste for music.

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ENTOMOLOGY

Flies Can Be Reared on Dog Biscuits and Yeast

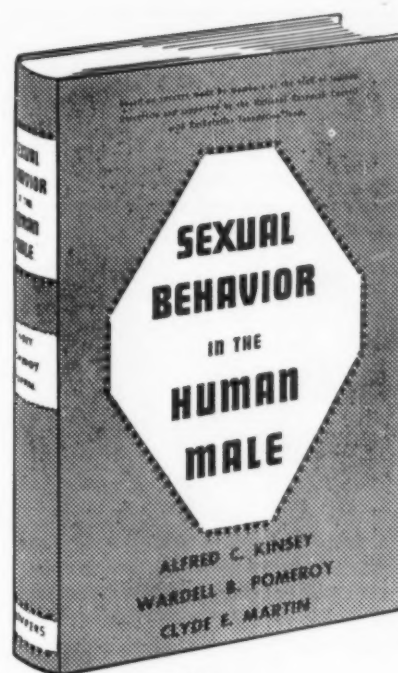
► FLIES by tens of thousands, needed for laboratory tests of the strength of DDT and other insecticides, as well as for research purposes, can be successfully fed through their infancy on moistened dog biscuit made to ferment by the addition of yeast. This new food for fly larvae is described by Dr. Hubert Frings, Pennsylvania State College entomologist, in *Science* (June 11).

Both houseflies and blowflies can be reared on this diet, despite the fact that in nature houseflies normally lay their eggs on horse manure and blowflies deposit theirs on decaying meat or other carrion. If the food mass becomes too moist while the larvae are growing, Dr. Frings adds coarse sawdust or fine wood shavings; the larvae take care of the mixing themselves.

Dog biscuits prove an exceedingly economical material for the mass rearing of flies. At current retail prices, one cent's worth provides food enough for 300 larvae.

After the flies emerge as winged adults they are kept in wire cages, on a diet of cube sugar, dry milk powder, and water. Flies thus fed provide a more dependable testing means for insecticides than their wild brethren brought up on slum rations.

Science News Letter, June 19, 1948



The KINSEY REPORT

In a recent Gallup public-opinion poll, overwhelming approval was given the publication of this book. Issued in the interests of better sex education and sociologic adjustment, this is definitely a report of great significance. Authorities acknowledge it to be one of the most important contributions to society to be made in the past 50 years.

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Evergreen Ecology

► EVERGREENS, it hardly needs to be re-emphasized, include many plants besides the needle-leaved conifers: all palms and cycads, many ferns, most magnolias, bays and laurels, the Christmas hollies, arid-land succulents as diverse as century plants, yuccas and aloes—all these and many more are evergreens. An evergreen, briefly, is a plant that retains its foliage during seasons when food manufacture and growth are suspended, whether it be during winter storms or summer drought.

Evergreenness has its advantages. It enables the plants to get into action immediately upon the return of favorable weather, without waiting to unfold and expand leaves that have been stored in buds or hidden underground. This is particularly helpful in the far north and at high altitudes, where the growing season is short, and also in deserts where rains may be brief and unpredictably irregular in their occurrence.

But there are drawbacks, too. Because of the great expanse of surface which

leaves have to present to the sun in order to carry on their food-manufacturing business, leaves are great evaporators. And when water is lacking, as in the desert, or frozen into unavailability, as in arctic and temperate-zone winters, evergreen leaves are under really critical stress.

Apparently in response to these recurring water crises, a number of interesting water-saving devices have been developed in evergreen leaves. Their surfaces are sometimes greatly reduced, as in conifer needles and the "mouse-ear" leaves of some desert plants; they may have thick, waxy or horny skins, as on holly and magnolia leaves; there are often hairy, scaly or light-reflecting coverings that protect against excessive sunshine; the microscopic stomata or "breathing-pores" frequently are sunk

in pits or grooves. As an extreme development, leaves may be omitted altogether and the green food-making surface confined to modified stems, as in cacti and similar succulents, or in such "switch-plants" as Australia's casuarina tree and the ephedras of China and our own Great Basin area.

There are also internal protections against excessive evaporation. These usually take the form of a concentrated or thickened sap, containing high percentages of mucilage-like polysaccharides or sometimes of mineral salts. As is well known, it is easy to evaporate water out of a very thin syrup, but as the syrup becomes thicker evaporation becomes slower and slower. The sap of some evergreen plants seems to work on the same principle, saving at least the minimum of water necessary for survival.

Science News Letter, June 19, 1948

PHYSIOLOGY

Aging Traced to Brain

► WE grow old because our brains grow old, and our brains grow old because they cannot keep themselves young by dividing.

This theory of aging is proposed by a German husband-and-wife research team, Drs. Oskar and Cecilie Vogt of Neustadt in the Black Forest. They built their own private laboratory there when the Nazis deprived them of their jobs before the war.

The Doctors Vogt point out that one-celled animals remain immortally young, unless accidentally killed, because they are constantly dividing to form new individuals. Other cells remain young so long as they are actively dividing, and grow old as they shape up into mature form. To divide, cells must first pull in all projections and extensions of their protoplasm.

In the human brain, practically all cell divisions have been accomplished several months before birth; after that, only increase in size and complexity is possible. Furthermore, all brain and nerve cells have extremely long processes or extensions. These are essential, for it is through these that they carry on the body's communication.

However, these extensions cannot be drawn back, partly because they are so long and partly because they are firmly embedded in each other and in other kinds of tissues. So brain cells are unable to divide, and can only grow old.

The two researchers, incidentally,

deny emphatically that over-use will hasten the brain's aging process. On the contrary, aging is likely to be faster in a little-used brain.

Science News Letter, June 19, 1948

ARCHAEOLOGY


Ancient Bronze Shield Found in Danish Peat Bed

► ONE of the most beautifully ornamented bronze shields ever uncovered north of the Alps has been added to the collection of the Danish National Museum. The shield is of hammered bronze, with hundreds of various-sized indentations forming 21 systems of ornamentation.

Only 15 bronze shields are known on the European continent away from the Mediterranean, although about 30 of this period but of a different type are known from the British Isles. Archaeologists have fixed the age as 2700 years and the place of original manufacture as northern Italy.

Of four Danish bronze shields about which the places of discovery are known, three, including the last one, have been uncovered within a radius of six miles on the island of Falster. Since they were all found in peat beds that were lakes in the Bronze Age it is considered probable the shields were deliberately placed in the water as an offering to the gods of the lakes.

Science News Letter, June 19, 1948



Save-the-Redwoods

Send 10 cents each for these attractively illustrated pamphlets: "A Living Link in History..." by John C. Merriam... "Trees, Shrubs and Flowers of the Redwood Region," by Willie L. Jepson... "The Story Told by a Fallen Redwood," by Emanuel Fritz... "Redwoods of the Past," by Ralph W. Chaney. All four pamphlets free to new members—send \$2 for annual membership (or \$10 for contributing membership).

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Books of the Week

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THE ALPHABET—A Key to the History of of Mankind—David Diringer—*Philosophical Library*, 607 p., illus., \$12.00. Beginning with primitive means of communication, this work traces the history of first non-alphabetic and then alphabetic writing. Written in a non-technical way interesting to the layman.

THE AMERICANA ANNUAL, 1948—An Encyclopedia of the Events of 1947—A. H. McDannald, Ed.—*Americana Corporation*, 777 p., illus., \$10.00. An account of a year that the editor terms one of "great confusion and disappointment."

ASTRONOMY—A Textbook for Colleges—William Lee Kennon—*Ginn*, 737 p., illus., \$5.50. The author points out that astronomy, in addition to being a worthwhile study in itself, provides a rich background for the other natural sciences.

BEGINNERS'S GUIDE TO WILD FLOWERS—Ethel Hinkley Hausman—*Putnam's*, 376 p., illus., \$3.50. Arranged by color for easy identification. Certain flowers are marked "pick sparingly" and others "do not pick at all."

GARDEN SOILS—Their Use and Conservation—Arthur B. Beaumont—*Orange Judd*, 280 p., illus., \$3.50. Liberally illustrated and clearly written especially for home gardeners.

HUMAN GEOGRAPHY—An Ecological Study of Society—C. Langdon White and George T. Renner—*Appleton*, 692 p., illus., \$6. Text for a beginning course in college geography. Beautifully illustrated.

MAGNETIC RESULTS FROM HUANCAYO OBSERVATORY, PERU, 1922-1935—H. F. Johnston and others—*Carnegie Institution of Washington*, 609 p., illus., paper \$3.25, cloth \$3.75.

MAGNETIC RESULTS FROM HUANCAYO OBSERVATORY, PERU, 1936-1944—H. F. Johnston and others—*Carnegie Institution of Washington*, 385 p., paper \$2.00, cloth \$2.50.

MICROWAVE TRANSMISSION CIRCUITS—George L. Ragan, Ed.—*McGraw-Hill*, 725 p., illus., \$8.50. Another in the MIT Radiation Laboratory series having to do with the principles and techniques underlying radar.

PROCEEDINGS VOLUME OF THE GEOLOGICAL SOCIETY OF AMERICA FOR 1947—*Geological Society of America*, 235 p., illus., paper, \$1.50.

PSYCHIATRY IN A TROUBLED WORLD—Yesterday's War and Today's Challenge—William C. Menninger—*Macmillan*, 636 p., \$6.00. Among the few good things that came from war, terrible as it was, we can count the awareness of the importance of our national mental health and its dependence on healthy emotions in the home. The author, who was Chief Consultant in Neuropsychiatry in the Army, evaluates the lessons taught by war.

Q. E. D.—M. I. T. in World War II—John Burchard—*Wiley*, 354 p., illus., \$3.50. A

description of what one privately endowed American institution, the Massachusetts Institute of Technology, contributed toward our victory over the Axis powers, as told by the director of libraries of the Institute.

READINGS IN BIOLOGICAL SCIENCE—Irving William Knobloch, Ed.—*Appleton*, 449 p., \$3.00. Selections from the writings of great naturalists presented in the hope of giving students an understanding of scientific method and "the forces that have reshaped our civilization and which now threaten to destroy it."

RECENT PROGRESS IN LAMINATED WOOD—*Northeastern Wood Utilization Council, Inc.*, 72 p., illus., paper \$2.00.

SCIENCE AND THE MODERN WORLD—Alfred North Whitehead—*New American Library*, 212 p., paper, 35 cents. A well-known book on philosophy originally published by Macmillan.

SMOKE—The Problem of Coal and the Atmosphere—Arnold Marsh—*Faber (Sherwood Press)*, 306 p., illus., \$7.00. A British publication about the problem of pollution of the atmosphere and how to combat it.

STUDIES OF HISTORICAL DOCUMENTS IN THE LIBRARY OF THE AMERICAN PHILOSOPHICAL SOCIETY—*American Philosophical Society*, 126 p., illus., paper, \$1. Including some new source materials on "B. Franklin, Printer."

SUBSURFACE GEOLOGIC CROSS SECTION FROM BACA COUNTY TO YUMA COUNTY, COLORADO—John C. Maher—*University of Kansas*, 11 p., map, paper, 25 cents. Prepared by Geological Survey, U. S. Department of the Interior with cooperation of State Geological Survey of Kansas.

TELEVISION—How It Works—John F. Rider, 203 p., illus., paper, \$2.70. A textbook for those who are learning to service these sets.

YOUR AQUARIUM—Brief, Clear Directions for Keeping Fishes and Plants in Health—William T. Innes—*Innes Pub. Co.*, 4th ed., 32 p., illus., paper, 25 cents. A beautifully illustrated booklet of hints to beginners.

Science News Letter, June 19, 1948

CHEMISTRY

Uranium Obtainable from Low-Grade Domestic Ores

► URANIUM, source of atomic energy, is now obtainable from low-grade domestic carnotite ores, by a new process on which U. S. patent 2,442,429 has been issued to two Ohio State University chemists, Dr. Ralph D. Nye and Prof. Dana J. Demorest. Release from dependence on overseas sources of higher-grade uranium ore might prove exceed-

ingly important to American economy and security.

In the new process, the finely ground ore is first treated with a hot solution of caustic soda or potash. This dissolves the three valuable metals present in carnotite: uranium, radium and vanadium—the latter important in metallurgy. The dark, slimy solution is washed free of the worthless sandy mineral matrix of the ore by upward currents of water.

Then sulfuric acid is added to the solution, followed by the addition of barium chloride or other metallic salt. This precipitates a dark sludge which contains most of the vanadium; this can be removed and processed as an ore concentrate to obtain that metal. The clear liquid remaining, which contains the uranium and radium, is again treated with caustic alkali solution, which brings down a precipitate containing the valuable uranium and radium in concentrated form.

Science News Letter, June 19, 1948

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☼ **MOISTURE METER**, to determine when the lawn or garden has been watered to the desired depth, consists of a post to drive into the soil on which is a movable metal flag. On the bottom of the flag is a probe, adjustable in length, which is pushed into the ground. When the soil is wet down to the end of the probe, it softens and a spring pops the flag to the top of its post.

Science News Letter, June 19, 1948

☼ **TABLE MAT**, to protect the surface from hot dishes, is a grille-work of plastic strips standing on their edges. The heat-resistant plastic used is easily cleaned in warm water; the mat is stain-proof and will not warp.

Science News Letter, June 19, 1948

☼ **BULLETIN BOARD** is made of thin steel and notices displayed on it are held in place with small magnets instead of the customary pins and tacks. The magnets are a type containing aluminum, nickel and iron, and hold strongly to the steel board even through sheets of paper.

Science News Letter, June 19, 1948

☼ **MAIL BAG** is made of a fabric woven of fiber-glass yarn and coated with a vinyl resin. This new-type fire-resistant and waterproof pouch was developed for the Post Office Department and is particularly suitable for airmail.

Science News Letter, June 19, 1948



☼ **HAIR-TRIMMER**, shown in the picture, is a two-handed plastic comb with a razor blade attached at its center. The position of the blade is fixed where desired by a sliding thumb nut; any single-edged blade can be used.

Science News Letter, June 19, 1948

☼ **TOY FISH** for the youngster has a wiggling tail that propels it through water. The wiggle comes from inside mechanism operated by a spring which is wound up by a tiny crank in the snout of the fish. Water ballast controls buoyancy and permits submerged swimming.

Science News Letter, June 19, 1948

☼ **ENVELOPE-ADDRESSING** machine uses only a master tape and colorless fluid, without stencils, plates, ink or ribbons. Addresses are written with an ordinary typewriter on a long paper tape backed by a carbon strip. The tape will reproduce each address about 100 times.

Science News Letter, June 19, 1948

☼ **AUTOMATIC ICE** machine produces thousands of ice cubes a day, each with a pencil-sized hole through it. This hole penetrating the center of each prevents the cubes in storage from re-freezing and clumping together. The machine, which operates on household electric current, cuts itself off when its bin is filled with ice cubes and on again when the bin is emptied.

Science News Letter, June 19, 1948

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Question Box

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What planes will attempt to beat the record of the XS-1? p. 387.

ENGINEERING

What new method has been found to prevent pipe corrosion? p. 391.

FORESTRY

What role have insects been found to play in elm disease? p. 390.

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NUCLEAR PHYSICS

What advantages will the new electrostatic accelerator have for atomic research? p. 389.

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What new fact has been revealed about the habits of gulls? p. 388.

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